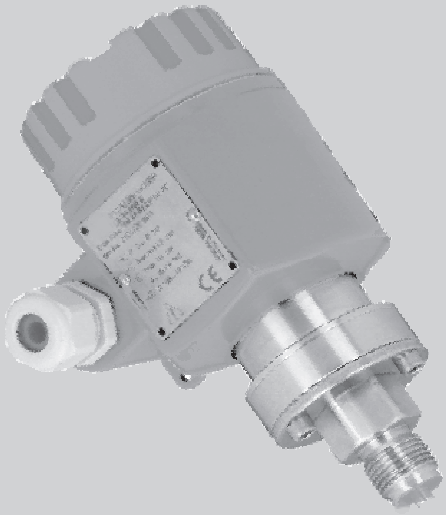


Transmitter-PM33

Intelligent pressure transmitter

from 100 mbar up to 400 bar

Self monitoring

Local display and adjustment

Multiple overload

Explosion protection ATEX 100

Analogue, Smart - or BUS- function

PROFILE

The transmitter PM33 measures gauge- and absolute pressure in gases, vapours and liquids and can be used in nearly all areas of process engineering. The transmitter works on the two-wire principle and features a polysilicon-measuring element. Gauge and absolute pressures from 100 mbar up to 400 bar respectively, are converted into a standard pressure proportional 4...20-mA signal. With the smart version remote operation is possible by means of HART protocol. The BUS version uses digital communication for the signal. The digital version can be equipped with a local display comprising digital display and bargraph whereas the analogue version allows only a bargraph display. The applied technology ensures reliable and simple operation.

DESCRIPTION

The transmitter comprises the measuring cell, the process coupling and the electronics housing. Connecting terminals are accessible in a separate compartment after opening the lid.

The process pressure acts onto a metallic isolating diaphragm. Via the filling media (Silicone oil or Inert oil) the pressure is transferred to the Polysilicon-sensor with the piezo-resistive bridge. The output signal of the bridge is being processed. According to the process requirements the isolating diaphragm is either flush mounted or is located inside the process coupling.

The analogue-electronic is an economic, fast and simple version of transmitter PM33. Zero and span can be adjusted locally by means of two potentiometers. With dip switches coarse setting of span with a spread of 1:1 up to 10:1 is possible. The required pressure signals must be provided as reference.

The analogue electronics features within the cell limits adjustment of Zero with ± 10 %.

Digital-electronics provides widespread operating and adjustment facilities with the corresponding hand-held terminal or via PC engineering. It realises precise signal processing and monitors the transmitter function from sensor to output function. Local operation is performed by means of push buttons and the pluggable display. The required pressure signals must be provided as reference and will be stored via push button operation.
Based upon the used measuring cell a turn down of 10:1 is possible.

The transmitter monitoring function generates an alarm if any fault is being detected. The alarm acts onto the analogue output signal and can be set in its function.

TECHNICAL DATA

INPUT

Absolute and gauge pressure in gases, vapours, liquids.
Polisilicon cell for ranges up to 400 bar

GAUGE PRESSURE

Cell		Measuring limits	Min. Span	Overload
Type	[bar]	[bar]	[bar]	[bar]
3H	1	0...1	0,1	4
3M	4	0...4	0,4	16
3P	10	0...10	1	40
3S	40*	0...40	4	160
3U	100*	0...100	10	400
3Z	400*	0...400	40	600
7H	± 1	-1...+1	0,2	4
7M	-1...4	-1...+4	0,5	16
7P	-1...10	-1...+10	1,0	40

*)Absolute pressure sensors

ABSOLUTE PRESSURE

Cell		Measuring limits	Min. Span	Overload
Type	[bar]	[bar]	[bar]	[bar]
4H	1	0...1	0,1	4
4M	4	0...4	0,4	16
4P	10	0...10	1	40
4S	40	0...40	4	160
4U	100	0...100	10	400
4Z	400	0...400	40	600

Minimum pressure: 10 mbar absolute

PROCESS MEDIA

Liquids, gases, vapour (aggressive or corrosive with suitable material).

WETTED MATERIALS

Diaphragm

– Stainless Steel SS 316 L (1.4435)

Process coupling

– Stainless Steel SS 316 L (1.4435)

Fig. 1 Dimensions

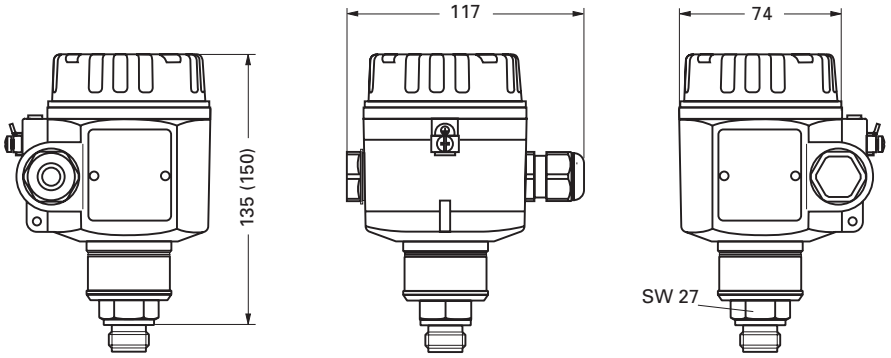
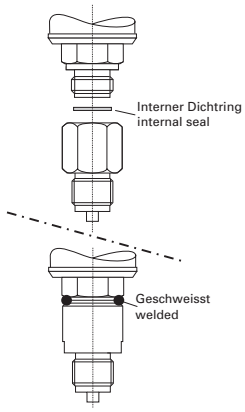


Fig. 2 Process-couplings



Filling media

Filling media	Medium temperature at 50 mbar p_{abs} 1 bar	Medium temperature at p_{abs} 1 bar	Remarks
Silicone oil	-40 to +180 °C	-40 to +200 °C	Standard
Fluorolube	-40 to +80 °C	-40 to +175 °C	Inert, for Oxygen
Voltalef	-40 to +80 °C	-40 to +175 °C	Inert, for Oxygen
Mineral oil	-10 to +80 °C	-40 to +110 °C	for Silicone-free

Process conditions

Process temperature: -40.... +100 °C

OUTPUT

	Analogue	Smart[1)]
Signal	4...20 mA	4...20 mA, with super imposed communication protocol
Signal on alarm	> 20.5 mA or < 3.6 mA settable	settable to > 20.5 mA or < 3.6 mA or HOLD
Ripple		(HART), measured on 500 47...125 Hz U_{PP}=200 mV, Noise: 500 Hz up to 10 kHz U_{RMS} 2.2 mV (on 500)
Characteristic	Pressure proportional	
Conformity error incl. hysterisis and reproducibility (limit point method)	± 0.3 %	
Integration time (settable)	0s, 2 s	0s, 2s, via HART 0...40 s
Rise time	60 ms	220 ms
Response time	180 ms	600 ms
Warm-up time	200 ms	1 s
Long term drift	0.1 % (FS) / year	

Output BUS: Profibus PA

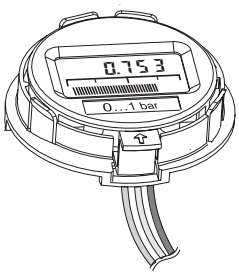
MAX. LOAD

$$R_{Load} \quad \frac{U_{Supply} \quad 11.5\ V}{0.023\ V} \quad R_{Lead}$$

DISPLAY

Analogue signal with with 28 segment LCD bargraph ≙ 0...100 %.
Smart version additional 4 digit 7 segment display.

Fig. 3 Display, smart version



OPERATION

Analogue	Adjustment of zero and span via DIP switches and two potentiometer direct. Selection of damping.
Smart	Adjustment of zero and span by means of two push buttons direct. Setting of damping. Remote operation via HART protocol
BUS	Adjustment of zero and span by means of two push buttons direct. Setting ofAddress. Remote operation via digital protocol

SUPPLY

DIRECT CURRENT

11.5 ... 45 VDC
11.5 ... 30 VDC with EEx2)

Ripple of supply voltage

No effect for U_{RMS} ± 5 % within permissible range

Overvoltage category

II to DIN EN 61 010-1

EXPLOSION PROTECTION

Mode: ATEX100, II 1 / 2 G, EEx ia IIC T6[2)]

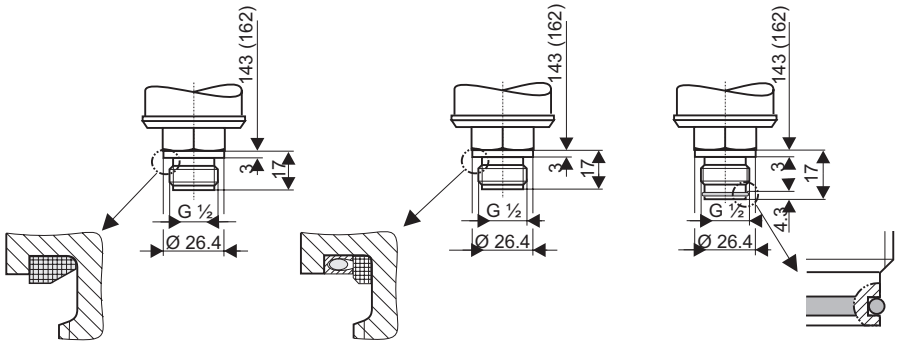
Certificate of conformity

DMT 03 ATEX E016

Mounting

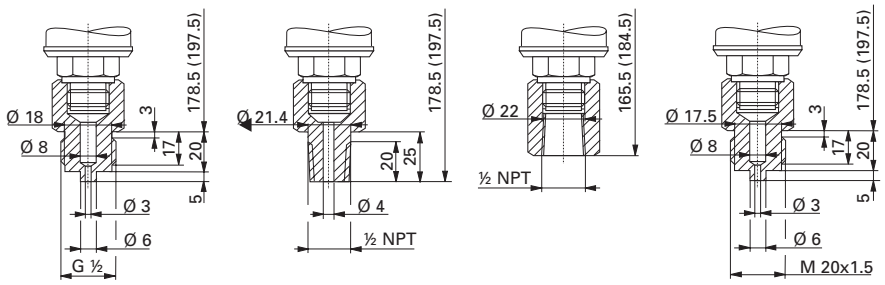
Transmitter in hazarded area G2

Fig. 4 Process couplings flush diaphragm



1) inverse signal direction possible with clear text and order code xxx9x
2) EEx only with "smart" electronics.

Fig. 5 Process coupling with internal diaphragm



ENVIRONMENTAL CONDITIONS

AMBIENT TEMPERATURES

For operation: -40... + 85 °C
For storage: -40.... +100 °C (with display +85 °C)

Temperature effect T_K*) for span start and span
(Referred to nominal value of cell)
*) But not exceeding error due to thermal effects.

Analogue		Smart	
-10...+60°C	-40...10 < > +60...85°C	-10...+60 °C	-40...10 < > +60...85°C
± 0.15 %/10 K	± 0.2 % / 10 K	± 0.08 %/10 K	± 0.1 % / 10 K

Thermal effect

Referred to set span

X% *TD* 0.3%

(TD = nominal value/set span)

Analogue		Smart	
-10...+60°C	-40...10 < > +60...85°C	-10...+60 °C	-40...10 < > +60...85°C
X = 0.3	X = 0.5	X = 0.2	X = 0.4

Climatic class

4K4H to DIN EN 60721-3

Vibrations

No effects with 4 mm stroke at 5...15 Hz, or
2g at 15...150 Hz, or 1 g at 150...2000 Hz

ELECTROMAGNETIC COMPATIBILITY

Complies with EN 50 081-1 and EN 50 082-2 as also
NAMUR recommendation NE21:
effect < 0.5 %

GENERAL

ELECTRONIC HOUSING

di-cast aluminim (AlSi12) surface chromated, Epoxy coated
Cover seal: Silicone rubber
Type label: Stainless steel

MODE OF PROTECTION

IP 66 / Nema 4 with cable gland
IP 68 / Nema 6P with fixed cable (1m WG for 24 h, respectively 1.8 m WG for 30 minutes).

ELECTRICAL CONNECTION

Screw terminals for 0.5...2.5 mm^2.
selectable via
Cable gland M20 x 1.5
Cable conduit for ½ NPT
or
Harting plug HAN 7
or
Fixed cable 5m with reference air feed
Profibus connection via M12x1 plug

INSTALLATION CONDITIONS

Orientation as required, orientation-dependent zero shifts up to 3 mbar can be adjusted.

WEIGHT approximately 1.6 kg

ACCESSORY

Analogue electronics 9499-040-64511
Smart-electronics 9499-040-64311
To be ordered separately
Atex Safety instructions 9499-047-10801

Fig. 6 Mounting bracket

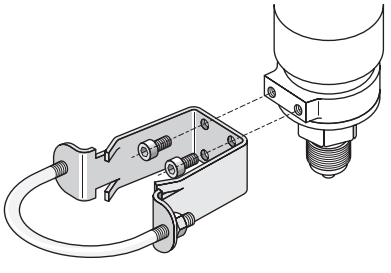


Fig. 7 Electrical connection analogue

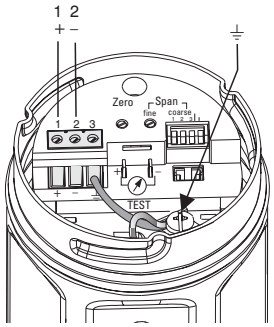


Fig. 8 Electrical connection digital

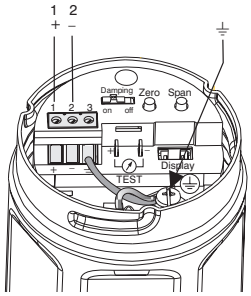
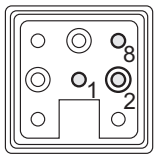


Fig. 9 Connection HARTING plug



1 = + (bl)
2 = - (bn)
8 = ⏚ (gn/ye)

ADDITIONAL ACCESSORIES

Bracket for wall or pipe mounting, stainless steel
9407-290-00051

Weld-in stud
9407-290-00081

Dummy pressure sensor
9407-290-00091

ORDERING STRUCTURE

Process- coupling
Material AISI SS316L (no. 1.4435)

0	G ½ A EN 837
1	G ½ A flush diaphragm
2	M 20 x 1,5 EN 837
3	½-14 NPT male
4	½-14 NPT female

Housing / el. conn.[1] / EEx[2]

Standard; M20 x 1,5	0
EEx; M20 x 1,5	1
Standard; ½-inch NPT	2
EEx; ½-inch NPT	3
Standard; connector HAN 7	4
EEx; connector HAN 7	5
Standard; IP68, fixed cable	6
EEx; IP 68, fixed cable	7

[1] Connection for Profibus via M12 x 1 plug
[2] EEx only with "smart"

Pressure

0	gauge
1	absolute
2	gauge with start at minus

Measuring span...
Span within the sensor limits in

0	mbar / bar
1	kPa / MPa
2	mm / m H_2O
3	inch H_2O
4	kgf / cm²
5	psi
9	from...to...to spec.

P M 3 3 ☐☐☐ ☐☐☐☐☐

Electronic / Display

analogue	0
analogue, Bargraph	1
smart	2
smart, display	3
Profibus PA	4
Profibus, display	5

Measuring cell

2	1bar
3	4 bar
4	10 bar
5	40 bar
6	100 bar
7	400 bar

Diaphragm / gasket / filling

SS 316L; FKM (e.g.Viton®; Mineral oil	0
SS 316L; FKM; Voltalef; degreased	1
SS 316L, NBR, Vegetable oil	2
SS 316L; FKM, Vegetable oil	3
SS 316L; welded; Mineral oil	4
SS 316L; welded; Voltalef for O_2[1]	5
SS 316L; welded; Voltalef; degreased	6

[1] max. 60 bar, 120 °C

Manual

0	without
E	english
F	french
D	german

Viton® registered trademark of DuPont Performance Elastomers

Fig. 10 Pipe mounting

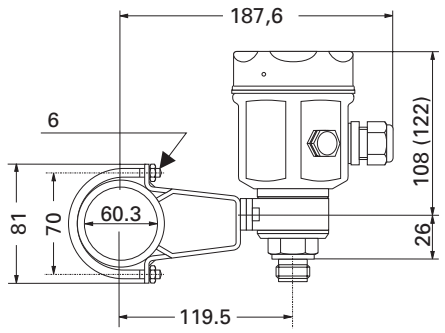
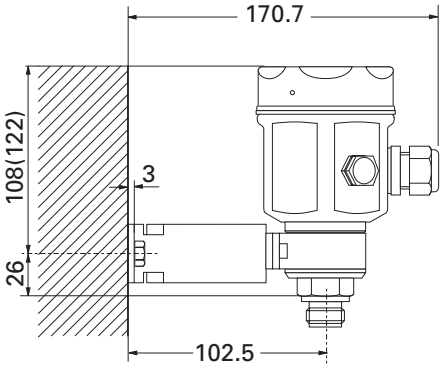


Fig. 11 Wall mounting



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